

SECTION C
DESCRIPTION/SPECIFICATIONS

PROJECT SPECIFICATIONS

TRACY - DELTA MENDOTA CANAL INTERTIE PROJECT



CALIFORNIA



SECTION C

DESCRIPTION/SPECIFICATIONS TRACY – DELTA MENDOTA CANAL INTERTIE PROJECT (TRY-DCI 69-KV TRANSMISSION LINE)

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DIVISION 1 - GENERAL REQUIREMENTS

A. CONTRACT REQUIREMENT:

Construct and complete the Tracy-Delta Mendota Canal Intertie (TRY-DCI) 69-kV Project, in accordance with the Construction Contract (Standard Form 1442); the Contract Clauses; Western Construction Standards, including Standard 1 - General Requirements (July 2009), Standard 2 - Sitework (July 2009), Standard 3 - Concrete (July 2009), Standard 5 - Transmission Line Steel Pole Structures (March 2010), Standard 7 - Wood Poles (July 2009), Standard 8 - Glued Laminated Structures (July 2009), Standard 9 - Substation - Electrical (July 2009), Standard 10 - Transmission Line - Electrical (July 2009), Standard 13 - Environmental Quality Protection (July 2009), Standard 15 Drawings (July 2009); standard drawings; and these project specifications and drawings.

If a conflict occurs between the project specifications and the construction standards, the project specifications shall govern. The project specifications and the drawings are used to take exceptions or provide additions to the standard specifications. Some paragraphs in the standard specifications will not apply to this job.

The standards and standard drawings are available at <http://www.wapa.gov/business/buys.htm>.

Western project specifications and standards are explained in Standard 1 - General Requirements, Section 1.1.1 "Standards and Project Specifications".

B. DESCRIPTION OF WORK:

The principal components of work include furnishing new materials and constructing approximately 4.7 miles of 69-kV transmission line, shoo-fly construction and removal, modifying two existing wood structures for optical overhead ground wire (OPGW) and installing one Government-furnished steel pole switch structure. The new TRY-DCI transmission line will tap Western's existing 69-kV Tracy-Contra Costa circuit near Western's Tracy Substation (TRY), and then run south on the west side of the Delta-Mendota Canal (DCM), to the DCI pumping plant site. One optical overhead ground wire (OPGW) will be installed.

Paragraphs "Description of Bid Items" in Divisions - 1, 2, 3, 5, 7, 8, 9, and 10 describe the work to be performed.

The work is located at and near Tracy Substation as shown on drawing TRY 0015.

C. DESCRIPTION OF BID ITEM:

1. **Bidding Schedule item "Mobilization and preparatory work"** includes the following:

- a. Performing mobilization and preparatory work in accordance with Section H of the contract clauses.
- b. Providing a Construction Program and a Safety and Health Program.

D. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK:

1. **COMMENCEMENT AND COMPLETION:** Begin work within 10 calendar days after date of receipt of Notice to Proceed. Submittals and materials acquisition is expected on/about February 4, 2011. Start of field construction activities is expected on/about May 2, 2011, and NST May 1, 2011. Complete all work by July 21, 2011.
2. **SUBMITTAL APPROVAL TIME:** Except as otherwise provided for specific submittals, Western will require 20 calendar days for review of drawings or data submitted for approval.

3. **OUTAGE RESTRICTIONS:** In addition to the restrictions listed in the standard specifications, the following outage restrictions shall apply:
 - a. A maximum of three (3) two-day outages will be allowed on the 69-kV Contra Costa line. These outages shall take place prior to June 1, 2011. These outages cannot be taken consecutively and will require a minimum of two days between each outage.
4. **CONSTRUCTION SCHEDULE RESTRICTIONS:** The following construction schedule restrictions shall apply:
 - a. DCI Pumping Plant Control Room and conduit infrastructure will not be available until June 30, 2011.
 - b. The OPGW from the TOS at Tracy Substation to the new glued laminated timber structure 0/5 shall be strung by June 1, 2011.
 - c. The conductor span between the new steel structure 0/4 and the new glued laminated timber structure 0/5 shall be strung by June 1, 2011.
 - d. The Contra Costa line shall be fully operational through the new steel structure 0/4 and the associated switch by June 1, 2011.
 - e. The Contractor shall have no more than 2 days to replace and test the garage building fiber optic cable (multimode fiber). This work shall be performed on a weekend.
 - f. Replacement of the garage building fiber optic cable shall begin during the weekend or during a federal holiday. The total time between the removal of the existing garage building fiber optics cable and installation of the new fiber optics cable shall be less than four days. This time shall not include more than two weekdays. The Contractor shall coordinate this time with USBR, IT Division, (209) 836-6201.
5. **MAXIMUM AVAILABLE FAULT CURRENT:** When protective ground leads are required, the protective ground leads shall be sized to carry the maximum available fault current in accordance with the Standard 1 - General Requirements, Section 1.4 "Safety and Health" and the following:
 - a. Maximum available fault current in the Tracy-Delta Mendota Canal Intertie transmission line area is 13.2 kA outside the Tracy substation and 36.5 kA inside the 69-kV system at Tracy Substation.

E. CONSTRUCTION PROGRAM:

1. **SUBMITTAL TIME:** Submit a construction program to the COR within 45 calendar days after date of Notice to Proceed.
2. **FORMAT AND DETAIL:** Dates for each item of Government-furnished material shall be provided. Do not program dates earlier than the estimated delivery dates shown in the "Material" paragraph. The construction program shall be completed using windows based Microsoft Project and submitted electronically (e.g., e-mail or CD-ROM) and in hard copy).

F. Government Furnished Material (GFM): Furnish all material for spare parts and for completing the work except for material furnished by Western as listed below:

(Quantity) Item	Estimated Weight (lbs)	Estimated Delivery Time	Estimated Cost
1. (144) Polymer-Fiberglass Insulators for Glued Laminated Type T21-B Assemblies	9.2 EA	Stored at EMF	\$8,500 Total
2. (63) Polymer-Fiberglass Insulators for Glued Laminated Type SIA11-B Assemblies	9.8 EA	Stored at EMF	\$3,700 Total
3. (30) Polymer-Fiberglass Insulators for Steel Pole Type T21-B Assemblies	10.7 EA	Stored at EMF	\$2,900 total
4. (15) Polymer-Fiberglass Horizontal Post Insulators for Glued Laminated Type HF1-F Assemblies	93 EA	Stored at EMF	\$2,880 Total
5. (45) Polymer-Fiberglass Horizontal Post Insulators for Glued Laminated Type HS1-F Assemblies	93 EA	Stored at EMF	\$8,640 Total
6. (75) Polymer-Fiberglass Horizontal Post Insulators for Wood Pole Type HF1-G Assemblies	93 EA	Stored at EMF	\$14,400 Total
7. (33) Polymer-Fiberglass Horizontal Post Insulators for Wood Pole Type HS1-G Assemblies	93 EA	Stored at EMF	\$6,500 Total
8. (15) Polymer-Fiberglass Station Post Insulators for Glued Laminated Type SP-1 Assemblies	93 EA	Stored at EMF	\$2,800 Total
9. (9) Polymer-Fiberglass Station Post Insulators for Glued Laminated Type SP-2 Assemblies	93 EA	Stored at EMF	\$1,700 Total
10. (1) Three-phase, three-way Load Break Switch	4,795 Total	Stored at Tracy Substation	\$20,000 Total
11. (1) 024W-45 (BP) Steel pole switch structure with maintenance provisions and anchor bolt cage	18,000	NST 3/1/11 NLT 3/31/11	\$31,000
12. (3) Single switch operating platforms	325 EA	NST 3/1/11 NLT 3/31/11	\$2000 Total

NST: No Sooner Than

NLT: No Later Than

1. POINTS OF DELIVERY: The Contractor is responsible for picking up, and transporting to the work site, and off-loading of Western furnished material. Provide 48 hours notice prior picking up the following Government Furnished Material.

- a. Insulators are available at the Elverta Maintenance Facility (EMF) located at 7940 Sorento Road, Elverta, CA 95626. Material will be available for pick up Tuesday thru Friday from 7:00 AM – 3:30 PM. Point of Contact for access is: Nate Solomon at 916-353-4567 or alternate Larry Bast at 916-353-4582.
- b. Three-phase, three-way load break switch is available at Western Area Power Administration, Tracy Maintenance Facility, 16800 Kelso Road, Byron, CA 94514. Material will be available for pick up Monday thru Friday from 7:00 AM – 3:30 PM. Point of Contact for access is: Nate Solomon at 916-353-4567 or alternate Larry Bast at 916-353-4582.
- c. The 024W-45 (BP) steel pole switch structure and three single switch operating platforms are available at Western Area Power Administration, Tracy Maintenance Facility, 16800 Kelso Road, Byron, CA 94514. Material will be available for pick up Monday thru Friday from 7:00 AM – 3:30 PM. Point of Contact for access is: Charles Forbes at 209-833-3040 or alternate Wence Galindo at 209-833-3050.

G. RIGHTS-OF-WAY:

1. **GENERAL:** Transmission line right-of-way is 50 feet wide. Western does not represent that the Contractor can gain access to every structure site or travel continuously along the transmission line. Orient construction methods and equipment to utilize Government-furnished rights-of way or obtain additional temporary access or staging areas without additional cost to Western. Any additional temporary access or staging areas acquired by the Contractor shall have prior COR approval since several areas of the transmission line have travel restricted areas. During the contract period, Western reserves the right to use Contractor-obtained access.
2. **ACCESS EASEMENTS:** Western has acquired access easements from existing public roads to the transmission line and some off right-of-way access along the transmission line. This off right-of-way access route is to provide access to the transmission line structure sites not accessible by traveling the transmission line.
3. **WORK ON THE RIGHT-OF-WAY:**
 - a. **General:** Perform work on the rights-of-way necessary for access to or along the transmission line. Only that excavation, dozing, or blading that is absolutely necessary will be allowed. Excavation, dozing, and blading for ease of travel may only be performed after field review and approval by the COR. Unauthorized excavation, dozing, or blading shall immediately be repaired by the Contractor or Western will have the damage repaired and backcharge the Contractor for all costs involved.
 - b. **Ease of Travel and Crane Landings:** Excavation, dozing, or blading done for ease of travel on any easement or for crane landings shall be restored to the original contour of the land and shall be compacted to a dry density not less than the natural in-place dry density of the surrounding earth. The use of water may be required to obtain the required density. Topsoil shall be stockpiled and spread on cuts prior to completion of work.

H. GEOLOGIC INVESTIGATIONS:

Geologic logs of subsurface explorations included in the "Drawings" Division constitute the information and records of geologic investigations for the work. Locations of subsurface investigations are shown on drawings.

Samples and cores of recovered material were not retained. Bidders shall obtain their own samples and perform tests on the material to evaluate properties, which they believe to be significant.

Western does not guarantee that the geologic information and records show the conditions that will be encountered in performing the work, but only that the geologic information and records show conditions encountered at the particular point and time the information and records were obtained. The geologic information may not indicate variations, such as those caused by seasonal fluctuations in rainfall and other factors, which may affect the water level. The Contractor shall determine the nature of material to be excavated, the difficulties of making and maintaining required excavations, and doing other work affected by geology and ground water elevations at the work site.

I. ELECTRIC POWER FOR CONSTRUCTION PURPOSES:

Make arrangements and provide all electric power for construction purposes outside Tracy Substation. Provide necessary transmission lines, distribution circuits, transformers, and other electrical equipment for distributing the power to the places of use. At contract completion, remove temporary electrical equipment and distribution lines.

J. WATER FOR CONSTRUCTION PURPOSES:

Furnish water for construction purposes. Make arrangements for obtaining the water, and provide for conveying the water to the points of use.

K. SUBMITTALS:

1. GENERAL: The Contractor shall furnish submittals as specified in the construction standards and the project specifications.
2. APPROVAL TIME: Approval time for submittals shall be in accordance with the "Commencement, Prosecution, and Completion of Work" paragraph.
3. ADDRESSES: The Contractor shall transmit submittals to the following addresses:

a. COR:

Western Area Power Administration
Manager, Gary Lachvayder Construction Office
P.O. Box 6457
Phoenix, AZ 85005-6457

b. Electrical Engineer:

Western Area Power Administration
ATTN: A7910, Ross Clark
P.O. Box 281213
Lakewood, CO 80228-8213

c. Civil Engineer:

Western Area Power Administration
ATTN: A7920, Doug Hanson
P.O. Box 281213
Lakewood, CO 80228-8213

d. Environmental Specialist:

Western Area Power Administration
Sierra Nevada Region

ATTN: N1410, David Young
114 Parkshore Drive
Folsom, CA 95630

e. Control Systems Engineer:

Western Area Power Administration
ATTN: A7930, Dan Hamai
P.O. Box 281213
Lakewood, CO 80228-8213

f. Telecommunication Lead Engineer

Western Area Power Administration
Sierra Nevada Region
ATTN: N5520, B. Silva
114 Parkshore Drive
Folsom, CA 95630

DIVISION 2 – SITEWORK

L. DESCRIPTION OF BID ITEMS:

1. **Bidding Schedule item “Removing existing 69-kV structure 0/4”** includes the following:

- a. Removing electrical items and wood pole structure 0/4 on the existing Tracy-Contra Costa 69-kV transmission line. Items removed from the existing structure shall become property of the Contractor, shall be removed promptly from the Right of Way (ROW), and may not be reused in constructing the new line.
- b. Backfilling and compacting the hole resulting from removal of the existing structure 0/4.
- c. Approximate quantities are listed in Tables 2-1 and 2-2. The Contractor shall determine the actual quantities to be removed and, regardless of the quantities removed, payment will only be made for the lump sum price bid in the Bidding Schedule.
- d. Remove insulator assemblies, complete with accessories, listed in Table 2-1.

TABLE 2-1 – Electrical Items to be Removed

Material	Unit	Quantity
Porcelain Horizontal Post Insulator Assemblies	EA	3

- e. Remove the wood pole structure, listed in Table 2-2.

TABLE 2-2 – Wood Pole Structures to be removed

Wood Pole Structure Type of Material	Quantity
Wood Suspension Structure	1

2. **Bidding Schedule item “Access road construction”** includes the following:

- a. Access road construction as directed by COR as shown on TRY-DCI 1003 and TRY-DCI 1004.

3. **Bidding Schedule item “Grading”** includes the following:

- a. Grading for line clearance between structures 3/15 and 3/16 shall be in accordance with drawing TRY-DCI 1004.

4. **Bidding Schedule item “Fence construction”** includes construction of the fence’s Southwest section as shown on drawing TRY-DCI 1003, and the East section as shown in TRY-DCI 1004. Barbed wire fence shall be in accordance with drawing 41 9002.

5. **Bidding Schedule item “Permanent gates for barbed wire fences”** includes construction of a gate to the West and a gate to the East as described on drawing TRY-DCI 1003 and drawing TRY-DCI 1004, respectively. Bidding schedule item Includes the following:

- a. Providing barbed wire gates according to drawing 41 9002, with the following provisions:
 - (1) Two warning signs shall be placed on each side of each gate in accordance with drawing 31 1089.

6. Bidding Schedule item “Fence grounds” includes the following:

- a. Grounding the following:
 - (1) Metallic fences that cross under or are parallel to and within 150 feet of transmission line centerline. Grounding is not required at locations already having fence grounds.
 - (2) Metallic gates within the right-of-way.
- b. The number of fence grounds in the Bidding Schedule is an estimated quantity, and payment for fence grounds will only be made for the number of grounding rods actually installed.

7. Bidding Schedule does not contain separate items for the following. Include these items in applicable Bidding Schedule items.

- a. Clearing as directed by the COR.
- b. Additional grading for structure and line clearance as directed by the COR.
- c. Excavations for foundations.
- d. Unwatering excavations if required.
- e. Casing excavations if required.
- f. Disposing of excavated material.
- g. Roadway repairs includes repairing any damage to the roadway in accordance with the following:
 - (1) When the DMC Roadway is damaged as a result of work, the damaged roadway section shall be repaired prior to use of facility. All damaged paved areas shall be saw-cut and replaced with a minimum of 2 inches of properly compacted hot mix asphalt. Cold mix asphalt repairs will **not** be accepted as a permanent repair. A minimum roadway width of 12 feet must be maintained in all repaired areas.
 - (2) Emulsion - CRS-2h asphaltic emulsion at an application rate of 0.3 gallons per square yard in accordance with Section 37-1.05 of the State of California Standard Specifications.
 - (3) Prime Coat Prime Coat - SC-70 asphaltic emulsion at an application rate of 0.25 gallons per square yard in accordance with Section 37-1.05 of the State of California Standard Specifications.
 - (4) NOTE: Prime (or penetrating) coat is only required when Chipseal is applied to directly to gravel surfacing. Double chip application is required in these cases.
 - (5) Screenings - 3/8” crushed screenings meeting the requirements of State of California Standard Section 37-1.02.

- (6) Contractor shall restore gravel on all access roads removed as a result of work.
- h. Environmental quality protection in accordance with Division 13.

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DIVISION 3 - CONCRETE

A. GENERAL:

1. Material:
 - a. Cement: Type IIA cement in accordance with ASTM C 150.
 - b. Compressive Strength: 4000 psi at 28 days.
 - c. Water-Cement Ratio: Net water-cement ratio, exclusive of water absorbed by the aggregates, shall not exceed 0.52 by weight.
 - d. Type A and D water-reducing and retarding admixtures may be used if approved by the COR.
 - e. Use of fly ash is required in concrete.
2. Test for Potential Reactivity of Sand and Coarse Aggregate: Perform test for each source used. Perform tests for potential reactivity for the sand and coarse aggregate to be used by the Contractor. If the tests determine the aggregate(s) to be unsuitable as a concrete aggregate, a suitable source will be obtained by the Contractor.

B. DESCRIPTION OF BIDDING SCHEDULE ITEM:

1. **Bidding Schedule item "Concrete foundation"** includes providing the following:
 - a. Constructing concrete foundation for the Type 024W-45 steel pole switch structure as shown on drawing TRY-DCI 2100.
 - b. Concrete construction includes earthwork, formwork, reinforcement, material used in concrete, curing, finishing, joints, and other related work and material needed to complete the required concrete construction.
 - c. Unwatering auger excavation, if required.
 - d. Casing auger excavation, if required.

Measurement for quantities will be made on the basis of concrete quantities shown on drawing TRY-DCI 2100. Regardless of concrete quantities actually placed, payment will be based on the quantities shown on the drawing.

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DIVISION 5 - TRANSMISSION LINE STEEL POLE STRUCTURES

A. GENERAL:

One Type 024W-45 weathering steel pole switch structure will be delivered to Tracy Substation as shown on drawing TRY 0015. Structure components include pole shaft sections, anchor bolts, anchor bolt nuts, washers, and templates, fixed climbing rung sections and rungs, connection bolts, nuts, locknuts and/or lock washers. Steel pole shop drawings will be furnished when they are available.

Three single switch operating platforms will also be stored at Tracy Substation.

B. DESCRIPTION OF BIDDING SCHEDULE ITEM:

1. **Bidding Schedule item "Installing one Government-Furnished Type 024W-45 steel pole switch structure"** includes include assembling and installing the weathering steel pole structure complete with the following:

- a. Connection bolts, nuts, and locknuts.
- b. All pole shaft sections shall be jacked together in accordance with manufacturer's recommendations.
- c. Attaching rungs and installing fixed climbing rung sections on the structure with bolts, nuts, and locknuts or lock washers.
- d. Grounding for the structure in accordance with drawings 41 1015 and 43 2210 as follows:
 - (1) Furnishing and installing pigtail jumpers and ground rods in accordance with drawing 41 1015. Stainless steel ground plates are welded to the structure on either side of all slip joints and bolted connections, including davit arm and post insulator connections, and 6 inches above the base plates.
 - (2) After installing fixed climbing rung sections with bolts, nuts, and locknuts or lock washers, the rung section mounting plates shall be field-welded to the clips on the pole shafts in accordance with Note 6 on drawing 43 2210. Welding shall be sufficient to provide electrical continuity between the climbing rung sections and the pole shaft. Welding electrode series shall be E8018-C3 (preferred), E8018-C1, or E8018-C2.
- e. Installing the structure on the concrete foundation.
- f. Providing two structure number signs on the structures listed in accordance with drawing 41 9027. Two (2) structure number signs are required. Structure number signs shall be 7 inches wide and 34-inches high in accordance with the 1 and 2 digit mile marker detail on drawing 41 9027.

2. **Bidding Schedule item " Installing Government-furnished single switch operating platforms"** includes installing three (3) single switch operating platforms at the base of Structure No. 0/4, Type 024W-45 (BP), in accordance with drawings 31 1075 and 31 2014 as directed by the COR.

C. STRUCTURE DETAILS:

Structure details are listed in Table 5-1.

TABLE 5-1 -- STRUCTURE DETAILS

Structure Type and Height "H" * (Ft)	Str. No.	No. Pole Shaft Sections	Est. Pole Shaft Base Dia. (In)	Approx. Structure Weight (LB)
024W-45	0/4	2	48	15,500

*"H" refers to height portion of structure designation listed in Bidding Schedule which is distance from base plate to bottom tension insulator attachment.

DIVISION 7 - WOOD POLE STRUCTURES

A. DESCRIPTION OF BID ITEMS:

- 1. Bidding Schedule items for “Furnishing and installing 69-kV transmission line wood pole structures”** includes furnishing and installing structure grounding, structure signs, overhead optical ground wire and insulator support assemblies and the following:

- a. Class 2 wood poles complete with associated hardware in accordance with Western Area Power Administration standard structure drawing 41 6115.
- b. Copper Naphthenate will be the only preservative permitted.
- c. Dead-end tees shall be used in place of pole bands in accordance with standard drawing 41 6138.
- d. Structure signs in accordance with drawings 41 9004, 41 9026, and plan and profile drawings.

Certified copies of Data Sheets and Certifications in accordance with Western's Construction Standard 7 - Wood Poles shall be submitted. One copy shall be sent to the Civil Engineer and two copies to the COR.

- 2. Bidding Schedule item “Furnishing and installing bayonets”** includes furnishing and installing:

- a. Shield wire bayonets equal to Hughes Brothers part number B2502.X1. Guy wire to be attached to 0/1A in accordance with TRY-DCI 1005 and 41 6047. Bayonets shall be attached to existing structures numbered 0/2 and 0/3 as shown on drawing TRY-DCI 1005. Attach bayonets in accordance with the manufacturer's instructions.

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DIVISION 8 - GLUED LAMINATED STRUCTURES

A. DESCRIPTION OF BID ITEMS:

1. **Bidding Schedule items for “Furnishing and installing 69-kV transmission line glued laminated structures”** includes furnishing and installing select aggregate backfill for structures, structure grounding, structure signs, overhead ground wire and insulator support assemblies and the following:
 - a. Structure poles, cross arms, and knee braces, complete with associated hardware in accordance with Western standard structure drawings and plan and profile drawings:
 - (1) 41 6143 – Type LSSA-GL and LSLA-GL 69-kV Small and large angle suspension glued laminated wood structures - light loading.
 - (2) 41 6145 – Type LST-GL 69-kV tangent and angle tension glued laminated wood structure-light loading.
 - (3) TRY-DCI 6000 – Type LSTF-GL 69-kV Flat top tension structure light loading – glued laminated.
 - (4) The Contractor shall provide the most current plan and profile drawings to the glued laminated structure manufacturer.
 - (5) Copper Naphthenate will be the only preservative permitted.
 - b. Design requirements as shown on the drawings and as follows:
 - (1) Structure and attachments shall be designed for the simultaneous application of dead load, wind on the structure, and wire loads.
 - (2) Structure guys are not permitted.
 - (3) Conductor: 266.8 kcmil ACSR 26/7 “Partridge”.
 - (4) OPGW: 0.607 inch, 36 fiber.
 - (5) The glued laminated manufacturer shall determine the embedment depth and backfill material for the structures. Typically backfill consists of select aggregate, up to 2 inch minus, placed in 6 inch lifts.
 - (6) The glued laminated manufacturer shall provide attachment hardware based on criteria in the specifications and suitable for its intended use.
 - (7) Install in accordance with manufacturers recommendations.
 - (8) Poles shall be set within 3 inches of the specified setting.
 - (9) Grade B Construction.
 - (10) Refer to specification drawing TRY-DCI T407 for Geology.
 - (11) Refer to plan and profile drawings and standard drawings for LSSA-GL, LSLA-GL, LST-GL for design criteria and design data table below for LSTF-GL structures:

Structure Number	1/17	Number-Size		ahead	3-Partridge	1-.607
		Type		back	3-Partridge	1-.607
Type	29-LSTF-GL	NESC-C2-2007	Light Tension (lbs)	ahead	2729	3101
			(Initial)	back	2855	3140
Line Angle	0°	High Wind	Tension (lbs)	ahead	2360	3032
Max Span (feet)	317.7		(Initial)	back	2751	2954
Wind Span (feet)	241	60°F	Tension (lbs)	ahead	2075	2367
Weight Span (feet)	256		(Initial)	back	2086	2383
		Attachment Height (feet)			29	30.5

Structure Number	1/18	Number-Size		ahead	3-Partridge	1-.607
		Type		back	3-Partridge	1-.607
Type	29-LSTF-GL	NESC-C2-2007	Light Tension (lbs)	ahead	2841	3126
			(Initial)	back	2729	3101
Line Angle	0°	High Wind	Tension (lbs)	ahead	2690	2900
			(Initial)	back	2360	3032
Max Span (feet)	189	60°F	Tension (lbs)	ahead	2096	2391
Wind Span (feet)	238		(Initial)	back	2075	2367
Weight Span (feet)	177	Attachment Height (feet)			29	30.5

Structure Number:	3/14	Number-Size		ahead	3-Partridge	1-.607
		Type		back	3-Partridge	1-.607
Type	20-LSTF-GL	NESC-C2-2007	Light Tension (lbs)	ahead	2698	1630
			(Initial)	back	2852	3165
Line Angle	28.4°	High Wind	Tension (lbs)	ahead	2267	1399
Max Span (feet)	270		(Initial)	back	2766	2987
Wind Span (feet)	201	60°F	Tension (lbs)	ahead	2062	1001
Weight Span (feet)	0		(Initial)	back	2084	2414
		Attachment Height (feet)			20	21.5

<div>Structure Number:</div> <div>Type</div> <div>Line Angle</div> <div>Max Span</div> <div>Wind Span</div> <div>Weight Span</div>	3/15	Number-Size		ahead	3-Partridge	1-.607	
		Type		back	3-Partridge	1-.607	
	20.5-LSTF-GL	NESC-C2-2007	Light Tension (lbs)	ahead	2720	1640	
			(Initial)	back	2698	1630	
		High Wind	Tension (lbs)	ahead	2353	1499	
			(Initial)	back	2267	1399	
		60°F	Tension (lbs)	ahead	2064	1003	
			(Initial)	back	2062	1001	
		Attachment Height (feet)				20.5	22

<div>Structure Number:</div> <div>Type</div> <div>Line Angle</div> <div>Max Span</div> <div>Wind Span</div> <div>Weight Span</div>	3/16	Number-Size		ahead	3-Partridge	1-.607	
		Type		back	3-Partridge	1-.607	
	29-LSTF-GL	NESC-C2-2007	Light Tension (lbs)	ahead	2854	3141	
				back	2720	1640	
		28.9°	High Wind	Tension (lbs)	ahead	2773	2977
					back	2353	1499
	187	60°F	Tension (lbs)	ahead	2069	2370	
				back	2064	1003	
	130	Attachment Height (feet)				29	30.5
250							

Structure Number: Type Line Angle Max Span Wind Span Weight Span	4/8	Number-Size		ahead	3-Partridge	1-.607
		Type		back	3-Partridge	1-.607
	29-LSTF-GL	NESC-C2-2007	Light Tension (lbs)	ahead	2847	1602
			(Initial)	back	2853	3132
		High Wind	Tension (lbs)	ahead	2671	1690
			(Initial)	back	2753	2964
		60°F	Tension (lbs)	ahead	2097	954
			(Initial)	back	2068	2360
		Attachment Height (feet)				29

Structure Number:	4/9	Number-Size		ahead	3-Partridge	1-.607
		Type		back	3-Partridge	1-.607
Type	26.5-LSTF-GL	NESC-C2-2007	Light Tension (lbs)	ahead	2838	2836
			(Initial)	back	2847	1602
Line Angle	-21.5°	High Wind	Tension (lbs)	ahead	2746	2730
			(Initial)	back	2671	1690
Max Span	385	60°F	Tension (lbs)	ahead	2049	2049
Wind Span	342		(Initial)	back	2097	954
Weight Span	150	Attachment Height (feet)			26.5	28

Certified copies of data and drawings in AutoCAD 2010 version shall be submitted: one copy to the Civil Engineer and two copies to the COR.

- c. OFFLOADING: The Contractor is required to offload the poles with their equipment at designated sites. Access is along the canal operation and maintenance road. Most pole sites are immediately adjacent to the canal operation and maintenance road.

Canal road clearance limitations:

10 foot vehicle width
25 foot vehicle height

Load Limits:

Timber bridges – 15 ton
Concrete bridges – H20 Loading

For site locations refer to the plan and profiles from Tracy Substation to Grant Line Road. Poles shall be placed next to the structure sites. All poles for structure sites south of Grant Line Road shall be placed in a designated storage yard.

DIVISION 9 - SUBSTATION – ELECTRICAL

A. DESCRIPTION OF BID ITEMS:

1. **Bidding Schedule item “Furnishing and installing communication equipment rack”** includes furnishing and installing one 7 foot x 19 inch standard equipment rack in the TRY SLDMWA (Tracy San Luis & Delta-Mendota Water Authority) Server Room. This communication rack shall be used for installing fiber distribution unit (FDU) in Bidding Schedule item “Furnish and install substation fiber optics.”

a. Material: All communication equipment racks shall be commercially manufactured off-the-shelf items.

- (1) The communication equipment rack for installation at TRY SLDMWA Server Room shall be a “Telect” Unequal Flange Rack, Seismic Rated, Model Number 12353KW201, or equivalent. The racks shall be 19 inches closed duct, 7 foot high racks with 1.75 inch EIA Standard Hole Patterns. The racks shall have 43 Rack Units (RU) of space and shall have no top angle.

b. Installation:

- (1) Installation of Communications Equipment Rack

(a) DCI:

- 1 No new rack will be installed at DCI Control Room.

(b) TRY SLDMWA:

- 1 Install one 19 inch standard equipment rack at the TRY SLDMWA Server Room. The 19 inch rack shall be installed where the “future fiber termination rack” is indicated in drawing 1054057. The fiber rack shall be installed to leave sufficient clearance for standard 19 inch rackmount equipment in front of and behind the rack. The rack shall be installed following all manufacturer recommendations. The rack shall be installed according to drawings 41-7004 and 41-7005.

(c) TRY WAPA:

- 1 No new rack will be installed at TRY WAPA control room.

2. **Bidding Schedule item “Furnishing and installing substation fiber optics”** includes determining lengths, furnishing and installing conduit, fiber optic distribution cable (FODC) and inner duct, terminating the FODC, and connecting it to the patch panels at the DCI, TRY, substations. This fiber optics, including the OPGW installation, shall result in optical paths from TRY Service Building (12 single mode fibers) and SLDMWA Server Room (24 single mode fibers), to the DCI Control Room (36 single mode fibers).

a. Material: All fiber optic communications equipment shall be commercially manufactured off-the-shelf items.

- (1) The FODC for installation at DCI shall be Optical Cable Corporation’s DX036KSLX9YP (36 single mode fiber, indoor/outdoor, plenum rated), or equivalent. The FODCs for installation at TRY shall be Optical Cable Corporation’s DX024KSLX9YP (24 single mode fiber, indoor/outdoor, plenum rated), or equivalent

and Optical Cable Corporation's DX012KSLX9YP (12 single mode fiber, indoor/outdoor, plenum rated), or equivalent. The fibers shall have no factory splices in any continuous length. Each continuous length of cable shall be wound on a separate reel. The end of each length of cable shall be sealed so no moisture can enter the cable. The cable shall be wound onto the reel so it can be pulled off without binding, kinking, or other problems. All optical fibers for the FODC and pigtails shall be compliant with or exceed the requirements of ITU-T G.652.D.

- (2) Flexible inner duct for the FODC. Install FODC in the inner duct where not in conduit. This includes, but is not limited to cable installed in cable trays, cable trench, and under raised computer floor. Inner duct shall be corrugated (for maximum flexibility), orange, have a 3/4 inch diameter and have a preinstalled pull tape. Inner duct shall be UL listed and designed for plenum applications per NEC article 770.182 and resistant to the spread of fire per UL 2024, Vertical-Tray Flame Test (Plenum). Install couplers and connectors to attach inner duct to conduit and to neatly terminate the installation.
- (3) Fiber Splicing: All splicing (OPGW-OPGW, FODC-OPGW, FODC-pigtails) shall be fusion spliced with a maximum bidirectional splice loss of 0.10 dB.
- (4) Fiber Distribution Units (FDUs): ADC's FL2000 Series Fiber Optic Panel, Catalog Number FL2-C740072P2-6A00 (72 position, single mode, ST connectors, stranded softwall bundle, heat shrink fusion decks, 19 inches standard rack mount) or equivalent shall be furnished in the DCI Control Room. ADC's FL2000 Series Fiber Optic Panel, Catalog Number FL2-C440048P2-4A00 (48 position, single mode, ST connectors, stranded softwall bundle, heat shrink fusion decks, 19 inches standard rack mount), or equivalent shall be furnished at TRY SLD MWA Server Room. The FDU at TRY WAPA Service Building is existing. The catalog numbers above include pigtails. At the TRY WAPA Service Building pigtails are not provided. At the TRY WAPA Service Building the Contractor shall furnish pigtails.
- (5) FODC termination at the FDU: Fiber at DCI and TRY shall be terminated with factory assembled pre-connectorized pigtails. The pigtails shall be compatible with the FODC single mode fiber, have 900 micrometer buffer tubes and be at least 3 meters in length before splicing. Pigtails shall have ST connectors with an average insertion loss not to exceed 0.5 dB and return loss not less than 35 dB.

b. Installation:

(1) Installation of Conduit:

Installing the electrical conduit system includes providing equipment, material, and services required to complete the underground, and exposed substation conduit system as shown on the specification drawings. Install the FODC from the optical splice enclosure on the take-off-structure, through conduit and cable tunnel, to the optical patch panel in the Control Building. Conduit entering the cable tunnel from the take-off-structure will require drilling a hole in to the concrete wall of the cable tunnel.

(2) Installation of FDUs (Fiber Distribution Units):

(a) DCI:

1. Install one 72 position termination FDU at the DCI Control Room where "Three cabinets for PLC and communication equipment" is shown in

drawing 214-D-25296. Two of the cabinets are for Bureau of Reclamations and Power Line Carrier (PLC) equipment. One cabinet is for WAPA use. The 72 position termination FDU shall be installed in the cabinet for WAPA use. All of the manufacturer's recommendations and requirements for installing, transporting, and handling shall be followed by the Contractor.

(b) TRY:

- 1 Install one 48 position termination FDU at SLDMWA Server Room in "Future Fiber Termination Rack," shown on drawing 1054057. All of the manufacturer's recommendations and requirements for installing, transporting, and handling shall be followed by the Contractor.

(3) Installation of FODC

(a) DCI:

- 1 Install one 36 fiber FODC from the optical splice enclosure on the leg of the TOS (take off structure) through buried conduit and cable trenches to the FDU in the Control Room (see drawings DCI 1110, 214-D-25304). The 36 fiber FODC shall be routed from the splice enclosure on the leg of the TOS to Conduit 99. Conduit 99 runs underground to Pull Box 3; from Pull Box 3 to Pull Box 2; and from Pull Box 2 the conduit is embedded in Motor Deck EL 200.00 floor slab and runs to the electrical trench (see drawing 214-D-25295). The 36 fiber FODC shall be routed through the conduit, through the electrical trench to the Control Room. In the Control Room the FODC shall be routed to the FDU. The FODC shall be installed in inner duct at any point where not in a conduit. This includes, but is not limited to, cable installed in cable trench/trays and under raised access floors. FODC/inner duct installation shall include a 30 foot service loop.

(b) TRY:

- 1 Install one 24 fiber FODC and one 12 fiber FODC from the optical splice enclosure on the leg of the TOS through buried 2 inch conduit leading to the existing 69-kV tunnel. The 12 fiber FODC shall be routed to the TRY WAPA Service Building. The 24 fiber FODC shall be routed to the SLDMWA Server Room in the SLDMWA Control Building. The FODC shall be installed in inner ducts at any point where it is not in a conduit. This includes, but is not limited to, cable installed in cable trench/trays and under raised access floors.

- a) From the cable tunnel, the 24 fiber FODC to the SLDMWA Server Room shall be routed by the following route:

Cable Tray:

RVS 6	to	RVS 3
RVS 3	to	RG7A1
RG7A1	to	Server Room

The 24 fiber FODC shall be routed to "Future Fiber Termination Rack" shown in drawing 1054057. Drawing 214-D-16188 shows the

cable entry to the SLDMWA Server Room (also see drawings 214-D-16107, 214-D-16103 for additional cable entry and building details). The FODC/inner duct installation shall include a 30 foot service loop under the raised access floor.

- b) From the cable tunnel, the 12 fiber FODC to the WAPA Service Building shall be routed from the control tunnel to the Type C cable trenches, shown on drawing TRY 1000. From the cable trenches the 12 fiber FODC shall enter the TRY WAPA Service Building. In the TRY WAPA Service Building the fiber shall be routed to the "Fiber Distribution Unit #1," in rack A8 shown on drawing TCY 7124-2. Drawing TCY 4000 shows the location of the cable entry to the building and the location of rack A8. The FODC/inner duct installation shall include a 30 foot service loop under the raised access floor.

- (4) Terminate the FODC by splicing it to the pigtails in the FDUs in accordance to the industry standard color coding (ANSI/ITA-598-C-2005). Splicing FODC to the pigtails will be done at DCI Control Room (to terminate 1 36 fiber cable), TRY Service Building (to terminate 1 12 fiber cable), and SLDMWA Server Room (to terminate 1 24 fiber cable). Refer to drawing TCY 7193-2 for the termination position on the existing FDU for TRY Service Building. In the SLDMWA Server Room and the DCI Control Room the fibers shall be terminated to use the first 36, and 24 positions of the FDUs respectively.
- (5) Optical Fiber Splices (applies to all splicing): All fiber splices shall be fusion spliced and have mechanical protection for each splice. The maximum bidirectionally averaged splice loss shall be 0.10 dB.
- (6) Splicing the FODC to the OPGW and testing the completed installation is included under the Bidding Schedule item for furnishing and installing OPGW.

c. Fiber Optic Communication Drawings and Data:

- (1) All drawings and technical data required to be furnished by the Contractor shall be in English, and all dimensions on the drawings shall be in feet and inches, and all weight in pounds. The drawings and data shall be complete and accurate in their content. Originals and copies shall be legible.
- (2) Western shall have the right to require the Contractor to make any changes in the drawings and data that may be necessary to show the equipment furnished conforms to the requirements of these specifications. The design and coordination of the Contractor and Western assumes no responsibility to approve or review drawings and data that are submitted.
- (3) The following table summarizes the drawings and data required under these specifications.

TABLE 9.1 – Drawings and Data Schedule for Fiber Optic Communication

Type of Drawings and Data	Paragraph	Delivery Time	Type of Material	Quantity to A7930	Quantity to COR	Quantity to N5520
Material Data	2.a.	20 days after notice to proceed	Catalog Sheets	1	3	1

3. Bidding Schedule item “Furnishing and installing garage building fiber optics” includes removing existing fiber optic distribution cable (FODC) and inner duct, determining lengths, and furnishing and installing multi-mode fiber optic cable and inner duct between the garage building and USBR Control Building. These fiber optics shall replace the current damaged fiber cable. Installation and testing shall be in accordance with Division 1 – Construction Schedule Restrictions.

a. Material: All fiber optic communication equipment shall be commercially manufactured off-the-shelf items.

- (1) The fiber cable shall be a 12 count multi-mode type, “Hitachi” part number PN 60931-12 (Multimode 62.5/125µm), or equivalent. The FODC shall have a 600 pound minimum installation tensile load rating. The individual fibers shall have no factory splices in any continuous length. Both ends of each length of cable shall be sealed so no moisture can enter the cable. The cable shall be wound onto the reel so it can be pulled off without binding, kinking, or other problems.
- (2) Furnish and install flexible inner duct for the fiber cable. Install fiber cable in inner duct at any place where not in a conduit. Inner duct shall be corrugated (for maximum flexibility), yellow, have a 3/4 inch inner diameter and have a preinstalled pull tape. Innerduct shall be UL listed and designed for riser applications per NEC article 770.182 and resistant to the spread of fire per UL 2024, Vertical-Tray Flame Test (Riser). Install couplers and connectors to attach inner duct to conduit and to neatly terminate the installation.

b. Installation:

- (1) The existing “Optical Cable Corporation” part number DX06-055D00FNR fiber coming from the garage building to the USBR Control Building shall be removed from the existing conduit and disposed of by the Contractor. It shall be recycled to the maximum extent possible once removed.
- (2) Install FODC between the garage building and the USBR Computer Room in the SLDMWA (San Louis Delta Mendota Water Authority) Control Building through conduits, cable trenches, and cable trays. From the garage building it shall enter a 2” conduit in the floor. From here it goes to a manhole covered by an aluminum cover behind the Unit Sub “DXA” building. It then heads directly for manhole EXE, just north of the gate entering the 230-kV yard. The conduit then enters the yard cable tray 5, lid section from the end. The FODC shall be routed through the conduit and into the cable tray, where it shall then travel towards the control building, and loop into the other tray, before running into the cable tunnel. In the cable tunnel, the fiber shall be routed by the following route:

Cable Tray:

RVS 6	to	RVS 3
RVS 3	to	RG7A1
RG7A1	to	Server Room

From the cable trays it shall be routed into the USBR Computer Room in the SLDMWA Control Building. See drawings 214-208-1673, 214-D-16403 for fiber routing. See drawings TRY 1000, 214-208-1014, 214-208-1013, 214-D-16188 for conduit and cable tunnel routing information.

- (3) A service loop of 30 feet of FODC/inner duct shall be coiled underneath the raised floor of the USBR Computer Room. The installation in the WAPA garage building shall include a 30 foot service loop.
- (4) The Contractor shall coordinate with USBR, IT division, (209) 836-6201. USBR will disconnect the existing cable and reconnect the new cable once installed and tested.

c. Fiber Optic Testing:

- (1) Factory Tests for FODC: Attenuation tests shall be performed on each fiber of reel at the factory. Results shall be recorded and included in the packaging with the cables. Product data sheets showing the cable characteristics including dispersion, dimensional quality, and tensile strength shall be provided from the manufacturer.
- (2) Pre-installation Field Tests of FODC Cable Reel: The Contractor shall test all fibers of each cable reel after the fiber has been delivered to site and before installation. Notify the COR and USBR, IT Division at least 7 days prior to these pre-installation field tests to enable Western and Reclamation observers to be present. The Contractor shall perform an optical time domain reflectometer (OTDR) attenuation test at 850 nm and 1310 nm on each fiber of each reel. All pre-installation tests will be compared to the factory test results to insure the cable was not damaged during shipment. Contractor shall provide OTDR charts showing launch conditions and all other parameters used in setup, plus time and date. These charts shall illustrate fiber continuity and loss. Review the traces carefully and explain unusual discontinuities in detail. Contractor shall describe test setup, length of launch cable etc. The OTDR testing and waveforms shall be stored on an optical disk and included with the submittal. If the OTDR testing is performed using equipment other than Wavetek or Tektronics, the Contractor shall supply Western and USBR, IT Division with the software necessary to view the test results.
- (3) Post-Installation Field Tests: Contractor shall notify the COR and USBR, IT Division at least 7 days prior to the post-installation field tests to enable Western and USBR observers to be present. Perform end-to-end fiber tests once the fiber is fully installed. These tests shall include:
 - (a) OTDR charts at both 850 nm and 1310 nm showing launch conditions and all other parameters used in setup, plus time and date. These charts shall illustrate and quantify the losses and stress points on the fiber. Review the traces carefully and explain unusual discontinuities in detail. Photographs of OTDR test results will not be accepted. OTDR measurements shall be made in both directions. OTDR results shall be submitted for every fiber of the completed cable system. The OTDR testing and waveforms shall be stored on an optical disk and included with the submittal requirements. If the OTDR testing is performed using equipment other than Wavetek or Tektronics, the

Contractor shall supply Western and USBR with the software necessary to view the test results.

- (4) Instrument Calibration: All test equipment shall be calibrated with certification traceable to the National Institute of Standards and Technology relative to their intended use.
- (5) Qualifications of Testing Personnel: The fiber optic splicer/tester shall have a minimum of one year splicing/testing and operations experience with the OTDR and optical loss test equipment used for tests required in this specification, and shall be able to use all necessary test equipment without reference to test equipment instruction books while performing the required tests specified herein. All personnel performing splicing shall be certified to do so by the Electronic Technician Association or equivalent training program.
- (6) Any damage to the FODC shall be replaced by, and at the expense of, the Contractor. The Contractor shall be responsible for making modifications required to repair damage, subject to the USBR's approval. These modifications may include, but not be limited to the replacement and reinstallation of the fiber FODC.

d. Fiber Optic Communication Drawings and Data:

- (1) All data required to be furnished by the Contractor shall be in English. Originals and all copies shall be legible. The specific material to be provided shall be identified on catalog cut sheets if more than one model is identified on the sheet.
- (2) Western shall have the right to require the Contractor to make any changes in the drawings and data that may be necessary to show the equipment furnished conforms to the requirements of these specifications. The design and coordination of the fiber optic communication equipment shall be the responsibility of the Contractor and Western assumes no responsibility to approve or review drawings and data that are submitted.
- (3) The following table summarizes the drawings and data required under these specifications.

Drawings and Data Schedule for Fiber Optic Communication

Type of Drawings and Data	Paragraph	Delivery Time	Type of Material	Quantity to A7930	Quantity to N5520	Quantity to COR	Quantity to USBR, IT Division
Fiber Optic Material Data	3.a.	20 days after notice to proceed	Catalog Sheets	1	2	2	1
Factory Tests	3.c.(1)	With shipment	Test Results	1	2	2	1
Pre-installation Field Tests	3.c.(2)	14 days after receipt of equipment	OTDR Traces	1	2	2	1
Post-Installation Field Test Results	3.c.(3)	14 days after completion of tests	OTDR Traces and Loss Tables	1	2	2	1

Type of Drawings and Data	Paragraph	Delivery Time	Type of Material	Quantity to A7930	Quantity to N5520	Quantity to COR	Quantity to USBR, IT Division
Certification of Splicing Personnel	2.c.(5)	14 days prior to fiber testing	Copy of Certification	1	2	2	1

DIVISION 10 – TRANSMISSION LINE ELECTRICAL

A. DESCRIPTION OF BID ITEMS:

- Bidding Schedule items for “Furnishing insulator assembly hardware, complete with compression dead end or suspension clamp, suitable for 266,800 circular mil, ACSR, 26/7 conductor and installing complete 69-kV insulator assemblies with Government-furnished polymer-fiberglass insulators”** include furnishing hardware and performing work and tests to provide insulator assemblies shown on drawings 41 1020, 41 1023, 41 1024, and 41 1033. Material quantities for each type of structure are shown on drawings TRY-DCI 1000 and TRY-DCI T110.

TABLE 10-1 – Government-furnished 69-kV Polymer-Fiberglass
Suspension and Tension Insulator Characteristics

Suspension and Tension Insulator Characteristics	SIA11-B Suspension Insulator Glued Laminate	T21-B Tension Insulator Glued Laminate	T21-B Tension Insulator Steel Pole
Specified mechanical load rating (pounds)	20,000	20,000	20,000
Minimum 60 Hz wet flashover (kV)	255	255	295
Minimum positive critical impulse flashover (kV)	610	525	695
Minimum dry arc distance with grading ring (inches)	38	32	43
Minimum leakage distance (inches)	75	65	90

TABLE 10-2 – Government-furnished 69-kV Polymer-Fiberglass
Horizontal Post Insulator Characteristics

Horizontal Post Insulator Characteristics	HF1-F Horizontal Post Insulator Glued Laminate	HS1-F Horizontal Post Insulator Glued Laminate	HF1-G Horizontal Post Insulator Wood	HS1-G Horizontal Post Insulator Wood
Specified/Working Mechanical Load Rating (pounds)	500	2,500	500	2,500
Minimum 60 Hz wet flashover (kV)	187	187	187	187
Minimum positive critical impulse flashover (kV)	484	484	484	484
Minimum dry arc distance with grading ring (inches)	29	29	29	29
Minimum leakage distance (inches)	52	52	52	52

TABLE 10-3 – Government-furnished 69-kV Polymer-Fiberglass Station Post Insulator Characteristics

Station Post Insulator Characteristics	SP-1 Station Post Insulator Glued Laminate	SP-2 Station Post Insulator Glued Laminate
Specified/Working Mechanical Load Rating (pounds)	500	500
Minimum 60 Hz wet flashover (kV)	170	170
Minimum positive critical impulse flashover (kV)	484	484
Minimum dry arc distance with grading ring (inches)	29	29
Minimum leakage distance (inches)	52	52

2. **Bidding Schedule items for “Furnishing and installing optical overhead ground wire assemblies, complete with bolted dead end or suspension clamp, suitable for 0.607 inch diameter, 36 fiber wire”** includes furnishing material and performing work and tests to provide optical overhead ground wire assemblies shown on drawing 41 1031. An estimate of material quantities for each type of structure is shown on drawing TRY-DCI 1000 and TRY-DCI 1005.

- a. Optical overhead ground wire assemblies shall comply with the characteristics of Table 10-4.

Table 10-4 – Optical Overhead Ground Wire Assembly Characteristics

Optical Overhead Ground Wire Assembly Characteristics	OPGW-PBY Suspension Glued Laminate	OPGW-SP Suspension Glued Laminate	OPGW-PB Suspension Wood	OPGW-TV Tension Steel	OPGW-TH Tension Wood
Minimum Ultimate Strength (pounds)	15,000	15,000	15,000	15,000	15,000

3. **Bidding Schedule item for “Installing one Government-furnished 69-kV, three-phase, three-way load break switch”** includes installing the switch on the Type 024W-45 steel pole switch structure.

Location: Tap-Switch Structure 0/4 along Tracy DCI	Tracy DCI Contra Costa Line (1300 feet outside Tracy substation)	Closest Substation: Tracy Substation	Switch Type: Load Interrupt Switch; Outdoor, single-pole manually operated, properly labeled
PARAMETER	DUTY	Basis/Reasoning	RATING & REFERENCE
Power Frequency:			60 Hz
System Nominal Voltage (kV)			69
Maximum Voltage (kV)		105% Nominal:	72.5
Continuous current (A)	440	Duty based on Partridge conductor ampacity, rating matches other line switches	2,000
Basic Impulse Insulation Level (kV)		Standard (C37.32)	350
Peak withstand current (A)	57,800	1.7 symmetrical 3-phase; 3 transformers are in service at Tracy; ANSI C37.32, Table 3, Line 4:	114,000
Short-time withstand current (A)	34,000	3-phase fault current, 3 transformers in service at Tracy	44,000
Short time current duration	30 cycles	Zone 2 clearing	1 second
Load-making current (A)	440	Exact full load of Contra Costa loads unknown, line rating used instead	2,000
Load interrupting current (A)	440	Exact full load of Contra Costa loads unknown, line rating used instead	2,000

- a. Equipment Identification Signs (31 1000) - Total required - 3. Lettering on the signs shall be as follows:

- (1) TRACY LINE DISC SW 151.
- (2) DCI LINE DISC SW 153.
- (3) CONTRA COSTA LINE DISC SW 155.

4. **Bidding Schedule item for “Furnishing and installing three 266,800 circular mil, ACSR, 26/7 strand conductors”** includes furnishing, stringing, splicing, repairing, sagging, and clipping in the conductors; installing jumper loops; and furnishing and installing material to complete the conductor installations, except for material furnished and installed as a part of insulator assemblies and accessories. Furnish and install material including conductor, conductor joints, conductor repair sleeves, and joint inhibitor compound required to complete conductor installation.

- a. Measurement for furnishing and stringing conductors will be made horizontally along the centerline of the transmission line (excluding approach spans).

- b. Conductors shall comply with the characteristics of Table 10-6.

TABLE 10-6 – Conductor Characteristics

Conductor Characteristics	
Completed conductor size (circular mil)	266,800
Ultimate strength, as computed for the strength of the individual strands, not less than (pounds)	11,300
Aluminum Strands Number	26
Diameter (inches)	0.1013
Steel Strands Number	7
Diameter (inches)	0.0788
*Standard lengths of conductor on each reel (feet)	10,330

*Allowable minus tolerance 5 percent, no upper limit on length.

- c. Conductor shall be nonspecular type having the outer surface treated to produce a dull finish in accordance with the requirements of ANSI C7-69.

5. **Bidding Schedule item for “Furnishing and installing one 0.607 inch diameter, 36 fiber optical overhead ground wire”** includes furnishing, stringing, splicing, sagging, and clipping in the optical overhead ground wire, as described; and furnishing and installing material to complete the optical overhead ground wire installations, except for material furnished and installed as a part of suspension and tension assemblies for optical overhead ground wires and accessories, and the following:

- a. Coiling up at least 60 feet of additional OPGW cable at all splice locations with the tail fixed in the splice assembly housing, testing; and furnishing and installing the associated material to complete the installation of the OPGW as stated in the standards and specifications.

It shall be the responsibility of the Contractor to determine reel lengths, pulling lengths and pulling locations for the entire project.

- b. Material:

The DCI-TRY 69-kV circuit shall have one 36 fiber count OPGW. All optical fibers shall be equivalent to ITU-T G.652.D single-mode fiber. OPGW shall meet all IEEE-1138 standard requirements. The OPGW shall be equal to AFL Telecommunications Catalog Number CC-47/607. Special care is required in handling the fiber optic cable to prevent damage to any fibers, metal stranding or protective jacket. All of the manufacturer's recommendations and requirements for installing, transporting and handling shall be followed by the Contractor.

The OPGW shall have the specific characteristics shown below in Table 10-7. Measurement for furnishing and installing OPGW shall be made based on the horizontal center line span lengths shown on the plan and profile drawings.

TABLE 10-7 - Fiber Optic Cable Characteristics

# Fibers	Dia (in)	RBS (lbs)	Weight (lb/ft)	Min. Fault Current Rating
36	0.607	16,646	0.375	132(kA) ² s

- c. Installation: Install from a new splice enclosure on the East leg of the TOS (take-off structure) at Tracy Substation to a new splice enclosure on the TOS at DCI pumping plant. Installation shall be in accordance with these specifications and the OPGW manufacturer's recommended installation procedures. Ensure that the allowable bending radius of the fiber optic cable is not exceeded at any time. Equipment and methods used for stringing OPGW shall be subject to approval of the COR; ensure that the OPGW shall not be scratched, grooved, kinked, twisted, abraded, or otherwise deformed; and such that support structures will not be damaged. See drawings 41 1028, 41 1029 for fiber optic cable mounting. An Anti-Rotational device as recommended by the manufacturer shall be used to prevent the OPGW from twisting while being pulled. If the OPGW is damaged, Contractor shall repair or replace the damaged sections in a manner approved by the COR and at no additional cost to Western.
- d. Reel Lengths: Reel lengths shall take into account the cable distances between the splice locations, the amount wrapped at splice structures, the amount needed for the distance to splice trailer, and the amount removed after pulling operations.
- e. All optical ground wires shall be routed down and attached to the wood or steel structures and take-off structures at all splice locations as shown on drawings 41 1028 and 41 1029 and using guide clamps shown on drawing 41 1030.
- f. Optical Fiber Splices: All fiber splices shall be fusion spliced and have mechanical protection for each splice. The maximum bi-directionally averaged splice loss shall be 0.10 dB.
- g. Fiber Optic Testing: Perform fiber optic testing in accordance with the following:
 - (1) Factory Tests of OPGW: Factory tests shall be performed on each fiber of every reel at the factory. Results shall be recorded and included in the packaging with the cables. Product data sheets showing the cable characteristics including dispersion, dimensional quality, and tensile strength shall be provided from the manufacturer.
 - (2) Pre-installation Field Tests of OPGW and FODC: The Contractor shall test all fibers of each reel of OPGW upon delivery. Notify the COR at least 7 days prior to all pre-installation field tests to enable Western observers to be present. Contractor shall submit optical time domain reflectometer (OTDR) charts at both 1310 nm and 1550 nm showing launch conditions and all other parameters used in setup, plus time and date. These charts shall illustrate and quantify the losses of each length of fiber and stress points on the fiber. Review the traces carefully and explain unusual discontinuities in detail. Photographs of OTDR test results will not be accepted. The OTDR testing and waveforms shall be stored on a compact disk, (CD), and included with the submittal. If the OTDR testing is performed using equipment other than Wavetek or Tektronics, the Contractor shall supply Western with the software necessary to view the test results. All pre-installation tests on OPGW shall be compared to the factory test results. If the overall attenuation for a fiber increases by more than 1 dB, the reel will be rejected.

- (3) Post-installation Field Tests: Contractor shall notify the COR at least 7 days prior to the post-installation field tests to enable Western observers to be present. Perform end-to-end (patch panel-to-patch panel) tests for each fiber after all splices have been completed, and all splice boxes have been returned to their permanent position. These tests shall include:

- (a) OTDR charts at both 1310 nm and 1550 nm showing launch conditions and all other parameters used in setup, plus time and date. These charts shall illustrate and quantify the losses at each splice, length of fiber and stress points on the fiber. Review the traces carefully and explain unusual discontinuities in detail. Photographs of OTDR test results will not be accepted. OTDR measurements shall be made in both directions for all fiber paths. **Bidirectional averaged values shall be clearly displayed in a separate chart that identifies each splice location by structure number and direction of measurement.** Bi-directionally averaged splice loss shall not exceed 0.10 dB. OTDR results shall be submitted for every fiber of the completed cable system. The OTDR testing and waveforms shall be stored on an optical disk and included with the submittal requirements. If the OTDR testing is performed using equipment other than Wavetek or Tektronics, the Contractor shall supply Western with the software necessary to view the test results.

Any damage to the OPGW shall be replaced by, and at the expense of, the Contractor. The Contractor shall be responsible for making modifications required to repair damage, subject to the COR's approval. These modifications may include, but not be limited to the replacement and reinstallation of the fiber OPGW or fiber cable, splice boxes and splicing.

Continuity and attenuation at 1310 nm and 1550 nm using an optical loss test set (power meter) on each complete fiber path, to quantify overall end-to-end losses. Total end-to-end losses, including fiber loss, patch panels, connectors and splices shall not exceed loss limit as specified in table 10-8 below:

TABLE 10-8 – Maximum Fiber Path Losses

Fiber Path	# Fibers	1310 (dB)	1550 (dB)
DCI – TRY-WAPA	12	5.6	4.7
DCI – TRY-SLDMWA	24	5.5	4.7

- (4) Instrument Calibration: All test equipment shall be calibrated with certification traceable to the National Institute of Standards and Technology relative to their intended use.
- (5) Qualifications of splicing and testing personnel: The fiber optic tester shall have a minimum of one year testing and operations experience with the OTDR and optical loss test equipment used for tests required in this specification, and shall be able to use all necessary test equipment without reference to test equipment instruction books while performing the required tests specified herein. All personnel performing splicing shall be certified to do so by the Electronic Technician Association or equivalent training program.

h. Fiber Optic Communication Drawings and Data:

- (1) All drawings and technical data required to be furnished by the Contractor shall be in English, and all dimensions on the drawings shall be in feet and inches, and all weight in pounds. The drawings and data shall be complete and accurate in their content. Originals and all copies shall be legible.
- (2) Western shall have the right to require the Contractor to make any changes in the drawings and data that may be necessary to show the equipment furnished conforms to the requirements of these specifications. The design and coordination of the fiber optic communication equipment shall be the responsibility of the Contractor and Western assumes no responsibility to approve or review drawings and data that are submitted.
- (3) The following table 10-9 summarizes the drawings and data required under these specifications.

TABLE 10-9 – Drawings and Data Schedule for Fiber Optic Communication

Type of Drawings and Data	Paragraph	Delivery Time	Type of Material	Quantity to A7930	Quantity to N5520	Quantity to COR
Splice box - Material Data	5.A.6.e.(1)	14 days after notice to proceed	Catalog Sheets	1	2	3
Factory Test Results of OPGW and FODC	5.A.6.e.(1)	With shipment	Test Results	1	2	3
Pre-Installation Field Test Results of OPGW and FODC	5. A.6.e.(2)	14 days after receipt of equipment	OTDR Charts and Disk	1	2	3
Post-Installation Field Test Results	5. A.6.e.(3)	14 days after completion of tests	OTDR Charts and Disk	1	2	3
Certification of Splicing and Testing Personnel	5. A.6.e.(5)	14 days prior to fiber splicing	Copy of Certification	1	2	3

6. **Bidding Schedule item for “Furnishing and installing optical splice enclosures”** includes furnishing and installing the optical splice boxes and completing the splices on the various types of wood, glued laminate, and substation take-off structures.
 - a. The optical splice boxes for the TRY-DCI fiber optic paths shall include optical splice organizers for at least 36 single mode fusion splices. All splice box organizers shall allow for sufficient bend radius for the fibers as recommended by the cable/fiber manufacturer.
 - b. All splice boxes shall have at least two ports to accept incoming OPGWs or flexible conduit fittings. The optical splice enclosures shall be mounted 48 inches above ground level at substation take-off structures and 18 inches above ground level at glued laminated transmission line structures.
 - c. The optical splice boxes shall be Preformed Line Product's Coyote Splice Case (8 inches x 22 inches), suitable for the required number of splices, including splice trays and splice case Defender (where required), or equivalent. Splice boxes shall be furnished with splice trays and predrilled end plates for the cable(s) and conduit entrance. The Contractor shall seal any unused openings in the end plate with a manufacturer's

approved sealing assembly. Only the splice boxes mounted on transmission line structures (outside a substation) will require the Defender.

- d. All fiber splicing shall be done in order in accordance to the industry standard color coding (ANSI/TIA-598-C-2005).
 - e. The optical splice enclosure at the TRY TOS (Take Off Structure) shall follow drawing TCY-7300 for splicing from OPGW to FODC (Fiber Optic Distribution Cable).
7. **Bidding Schedule items “Furnishing and installing Stockbridge-type vibration dampers for 266,800 circular mil, ACSR, 26/7 conductors” and “Furnishing and installing Stockbridge-type or spiral-type vibration dampers for 0.607 inch diameter, 36 fiber optical overhead ground wire”** include determining the number of vibration dampers needed, furnishing material, and performing all work, including testing, required to furnish and install vibration dampers for ACSR conductors and optical overhead ground wire.
- a. Vibration Damper drawing TRY-DCI 1001 contains all the wire, span, and tension data necessary for a damper manufacturer to provide recommendations for quantities and spacing for dampers. The Contractor should provide this specification paragraph and the damper drawing to the manufacturer for application recommendations and final spacings for attachments.
 - b. The Contractor’s bid shall be for Stockbridge-type dampers for the ACSR conductors.
 - c. The Contractor’s bid shall be for either, but not both, the Stockbridge-type or spiral-type of dampers for the optical overhead ground wire.
8. **Bidding Schedule items for “Furnishing and installing 24 inch diameter aerial marker balls”** includes furnishing and installing 24 inch diameter aerial marker balls for the 0.607 inch diameter optical overhead ground wire in accordance with drawing 41 9029. Marker ball locations are indicated on plan and profile drawings.
9. **Bidding Schedule item for “Furnishing and installing aerial patrol warning signs”** includes furnishing and installing aerial patrol warning signs in accordance with the specifications, plan and profile drawings, drawings 41 9026 and 41 9029, and as directed by the COR. An estimate of aerial patrol warning sign quantities for each type of structure is shown in Table 10-10.

TABLE 10-10 – Aerial Patrol Warning Signs

STRUCTURE TYPE	AERIAL PATROL WARNING SIGNS
Glued Laminate	9
Wood Pole	6

10. **Bidding Schedule item “Furnishing and installing avian line marking devices”** includes furnishing and installing markers on optical overhead ground wires. The line marking devices shall be installed on all spans, every 50 feet along the optical overhead ground wire. The first 50 feet on either side of the structure does not need to be marked. The devices shall be gray in color and equal to: Tyco Electronics catalog number SFD 1520, sized to fit on 0.607 inch diameter optical overhead ground wire.

11. Bidding Schedule item “Shoo-fly” includes furnishing, installing and removing one 65-foot Class 2, wood pole structure with associated guys, guy protectors and anchors; in accordance with paragraphs of the appropriate divisions; the COR and the following:

- a. Locating and installing Shoo-fly S structure with steel pole tension insulator assemblies, guys and anchors in accordance with drawings 41 6047, TRY-DCI 1007, TRY-DCI T110, and TRY-DCI T111.
- b. Furnishing and installing pole bands, guy wires and anchors on existing structure 0/3 in accordance with drawings 41 6047, TRY-DCI 1007, and TRY-DCI T110.
- c. Stringing existing conductors from both 0/5 and 0/3 to the S pole. Complete conductor jumpers at S pole. Strain clamps may be used.
- d. Transferring the existing conductors from both 0/5 and 0/3 to the new steel pole. Steel pole tension insulator assemblies can be reused. Shoo-fly S structure post insulators become spares at the direction of the COR.
- e. Removing Shoo-fly S pole with guys and anchors upon completion of the steel pole switch structure. Removing the guys and anchors at existing structure 0/3. Contractor shall retain ownership of the wood pole, guys and anchors and remove from the ROW.

12. Bidding Schedule item “Spare parts” includes furnishing the following material and delivering to a location as directed by the COR:

- a. Hardware suitable for 266,800 circular mil, ACSR, 26/7 conductor for the following polymer-fiberglass suspension and tension insulator assemblies:
 - (1) Three (3) glued laminated single-string Type SIA11-B suspension assemblies including clamp.
 - (2) Six (6) glued laminated double-string Type T21-B tension assemblies including compression dead end.
 - (3) Three (3) steel pole double-string Type T21-B tension assemblies including compression dead end.
- b. Hardware suitable for 266,800 circular mil, ACSR, 26/7 conductor for the following polymer-fiberglass horizontal post insulator assemblies:
 - (1) Three (3) glued laminated Type HF1-F horizontal post assemblies including clamp.
 - (2) Three (3) glued laminated Type HS1-F horizontal post assemblies including clamp.
 - (3) Three (3) wood pole Type HF1-G horizontal post assemblies including clamp.
 - (4) Three (3) wood pole Type HS1-G horizontal post assemblies including clamp.
- c. Hardware suitable for 266,800 circular mil, ACSR, 26/7 conductor for the following polymer-fiberglass station post insulators:
 - (1) Three (3) glued laminated Type SP-1 station post assemblies including clamp.
 - (2) Three (3) glued laminated Type SP-2 station post assemblies including clamp.

- d. Optical overhead ground wire assemblies suitable for 0.607 inch diameter wire as follows:
 - (1) One (1) glued laminated suspension assembly Type OPGW-PBY with clamp.
 - (2) One (1) glued laminated suspension assembly Type OPGW-SP with clamp.
 - (3) Three (3) wood pole suspension assemblies Type OPGW-PB with clamp.
 - (4) One (1) steel pole tension assembly Type OPGW-TV with compression dead end.
 - (5) One (1) wood pole tension assembly Type OPGW-TH with compression dead end.
 - (6) Fifteen (15) avian marking devices.
- e. Twelve (12) vibration dampers for the conductor.
- f. Four (4) vibration dampers for the optical overhead ground wire.

DIVISION 13 – ENVIRONMENTAL QUALITY PROTECTION

A. GENERAL:

1. Environmental Requirements: The Contractor shall comply with all applicable Federal, State, and local environmental laws and regulations (Section 13.2 of Standard).
2. Landscape preservation (Section 13.3 of Standard)
 - a. GENERAL: Preserve landscape features in accordance with the contract clause titled "Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements."
 - b. CONSTRUCTION ROADS: Location, alignment, and grade of construction roads shall be subject to the COR's approval. The Contractor shall comply with the grading and erosion ordinance of Alameda County as stated in the Delta-Mendota Canal/California Aqueduct Intertie Record of Decision. When no longer required, surfaces of construction roads shall be scarified to facilitate natural re-vegetation, provide for proper drainage, and prevent erosion. If re-vegetation is required, use seed mixtures as recommended by Natural Resources Conservation Service or other land managing agency as appropriate.
 - c. CONSTRUCTION FACILITIES: Shop, office, and yard areas shall be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent. Storage and construction buildings, including concrete footings and slabs, shall be removed from the site prior to contract completion. The area shall be re-graded as required so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural re-vegetation, provide for proper drainage, and prevent erosion or transport of sediment and pollutants. If re-vegetation is required, use seed mixtures as recommended by Natural Resources Conservation Service or other land managing agency as appropriate.
3. Preservation of Cultural Resources (Section 13.4 of Standard)
 - a. GENERAL: Do not remove or alter cultural artifacts or paleontological resources (fossils). Cultural artifacts may be of scientific or cultural importance and includes, but is not limited to bones, pottery, glass, projectile points (arrowheads), other stone or metal tools, historic buildings, and features. Paleontological resources can be of scientific importance and include mineralized animals and plants or trace fossils such as footprints. Both cultural and paleontological resources are protected by Federal Regulations during Federal construction projects. Contractor shall restrict all ground disturbing activities to areas that have been surveyed by Western for cultural or paleontological resources and as specified in accordance with Standard 1 – General Requirements, Sections 1.3.1 Rights-of-way and 1.3.2 Access to the Work and Haul Routes.
 - b. KNOWN CULTURAL OR PALEONTOLOGICAL SITES: Following issuance of notice to proceed, Western will provide drawings or maps showing sensitive areas located on or immediately adjacent to the transmission line right-of-way and/or facility. These areas shall be considered avoidance areas. Prior to any construction activity, the avoidance areas shall be marked on the ground in a manner approved by the COR. Instruct employees, subContractors, and others that vehicular or equipment access to these areas is prohibited. If access is absolutely necessary, first obtain approval from the COR. Western will remove the markings during or following final cleanup. For some project work, Western will require an archaeological, paleontological or tribal monitor at or near cultural or paleontological site locations. The Contractor, Contractor's employees, and subContractors shall work with the monitor to insure that sensitive areas are avoided. Where monitors are required, the monitor shall meet with the crew each morning to go

over the day's work. The monitor will also conduct awareness training for all Contractors prior to any work in the field. Untrained personnel shall not be allowed in the construction area. For sensitive areas requiring a monitor, the Contractor may not access those areas without a monitor being present.

- c. UNKNOWN CULTURAL OR PALEONTOLOGICAL SITES: On rare occasions cultural or paleontological sites may be discovered during excavation or other earth-moving activities.
- d. Reporting: If evidence of a cultural or paleontological site is discovered, cease work in the area immediately and notify the COR of the location and nature of the findings. If a monitor is present, the monitor should also be notified. Stop all activities within a 200 foot radius of the discovery and do not proceed with work within that radius until directed to do so by the COR.
- e. Care of Evidence: Protect the area. Do not remove, handle, alter, or damage artifacts or fossils uncovered during construction.

4. Noxious Weed Control (Section 13.5 of Standard)

- a. Comply with Federal, State, and local noxious weed control regulations. Provide a "clean vehicle policy" while entering and leaving construction areas to prevent transport of noxious weed plants and/or seed. Transport only construction vehicles that are free of mud and vegetation debris to staging areas and the project right-of-way.

5. Recycled Material Quantities (Section 13.6 of Standard)

- a. GENERAL: All materials that can be recycled shall be. The Contractor shall record quantities of material by category that is salvaged, recycled, reused, or reprocessed including but not limited to: Aluminum Conductor – Steel Reinforced (ACSR), Steel, Aluminum, Copper, other metals, oil, gravel, asphalt, concrete, treated wood utility poles and crossarms, wood construction material, cardboard, etc.
- b. RECYCLED MATERIAL QUANTITY REPORT: The Contractor shall submit quantities of recycled material by category in pounds or metric tons to the COR prior to submittal of final invoice.

6. Use of Products Containing Recovered Materials (Section 13.7 of Standard)

- a. RECOVERED MATERIAL PRODUCTS: If the products listed below or other products listed at <http://www.epa.gov/epawaste/conserve/tools/cpg/products/index.htm> are obtained as part of this project, purchase the items with the highest recovered material content possible unless recovered material products are not available: (1) competitively within a reasonable time frame; (2) meeting reasonable performance standards as defined in the Standards or Project Specifications; or (3) at a reasonable price.
- b. Construction product examples include:
 - (1) Cement and concrete containing coal fly ash, ground granulated blast furnace slag, cenospheres, or silica fume.
 - (2) Flowable fill.
 - (3) Nonpressure pipe.
 - (4) Railroad grade crossing surfaces.

- c. BIOBASED MATERIAL PRODUCTS: If the products listed at <http://www.biobased.oce.usda.gov> are obtained as part of this project, purchase the items with the highest biobased content possible and no less than the percent indicated for each product unless biobased material products are not available: (1) competitively within a reasonable time frame, (2) meeting reasonable performance standards as defined in the Standards or Project Specifications, or (3) at a reasonable price.
- d. RECOVERED MATERIAL AND BIOBASED MATERIAL PRODUCTS REPORT: The Contractor shall provide the COR the following information for purchases of those items listed above:
 - (1) Quantity and cost of listed items with recovered or biobased material content and quantity and cost of listed items without recovered or biobased material content prior to submittal of final invoice.
 - (2) Written justification 7 work days prior to purchase of listed items if recovered material or biobased material products are not available: (1) competitively within a reasonable time frame; (2) meeting reasonable performance standards as defined in the Standards or Project Specifications; or (3) at a reasonable price.

7. Disposal of Waste Material (Section 13.8 of Standard)

- a. GENERAL: Dispose or recycle waste material in accordance with applicable Federal, State and local regulations and ordinances. In addition to the requirements of the Contract Clause "Cleaning Up", remove all waste material from the construction site. No waste shall be left on Western property, right-of-way, or easement. Burning or burying of waste material is not permitted.
- b. HAZARDOUS, UNIVERSAL, AND NON-HAZARDOUS WASTES: Manage hazardous, universal, and non-hazardous wastes in accordance with State and Federal regulations.
- c. USED OIL: Used oil generated from the Contractor activities shall be managed in accordance with used oil regulations.
- d. RECYCLABLE MATERIAL: Reduce wastes, including excess Western material, by recycling, reusing, or reprocessing. Examples of recycling, reusing, or reprocessing includes, but is not limited to, reprocessing of solvents; recycling cardboard; and salvaging scrap metals.
- e. REFRIGERANTS AND RECEIPTS: Refrigerants from vehicles shall be reclaimed with certified equipment operated by certified technicians if the item is to be disposed. Refrigerants shall be reclaimed and not vented to the atmosphere.
- f. WASTE MATERIAL QUANTITY REPORT: Submit quantities of total project waste material disposal as listed below to the COR prior to submittal of final invoice.
 - (1) Unregulated Wastes (i.e., trash): Volume in cubic yards or weight in pounds.
 - (2) Hazardous or Universal Wastes: Weight in pounds.
 - (3) PCB Wastes: Weight in pounds.
 - (4) Other regulated wastes (oil, etc.): Weight in pounds (specify type of waste in report).

8. Contractor's Liability for Regulated Material Incidents (Section 13.9 of Standard)

- a. **GENERAL:** The Contractor is solely liable for all expenses related to spills, mishandling, or incidents of regulated material attributable to his actions or the actions of his subContractors. This includes all response, investigation, cleanup, disposal, permitting, reporting, and requirements from applicable environmental regulation agencies.
- b. **SUPERVISION:** The actions of the Contractor employees, agents, and subContractors shall be properly managed at all times on Western property or while transporting Western's (or previously owned by Western) regulated material and equipment.

9. Pollutant Spill Prevention, Notification, and Cleanup (Section 13.10 of Standard)

- a. **GENERAL:** A Spill Plan provides written measures to prevent spills of pollutants and prepares for appropriate response if a spill occurs. A pollutant includes any hazardous or non-hazardous substance that when spilled, will contaminate soil, surface water, or ground water. This includes any solvent, fuel, oil, paint, pesticide, engine coolants, and similar substances.
- b. **SPILL PREVENTION NOTIFICATION AND CLEANUP PLAN (Plan):** Provide the Spill Plan to the COR for review and comment 14 days prior to start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. Include the following in the Plan:
 - (1) **Spill Prevention measures.** Describe the work practices or precautions that will be used at the job site to prevent spills. These may include engineered or manufactured techniques such as installation of berms around fuel and oil tanks; Storage of fuels, paints, and other substances in spill proof containers; and management techniques such as requiring workers to handle material in certain ways. This shall include the use of hazard communication (hazardous material and waste labeling). No incompatible hazardous materials shall be stored together.
 - (2) **Notification:** The Contractor is responsible for reporting spills into the environment to the appropriate agencies. Most States and the Environmental Protection Agency require by regulation, that anyone who spills certain types of pollutants in certain quantities notify them of the spill within a specific time period. Some of these agencies require written follow up reports and cleanup reports. Include in the Plan, the types of spills for which notification would be made, the agencies to be notified, the information the agency requires during the notification, and the telephone numbers for notification.
 - (3) **Employee Awareness Training.** Describe employee awareness training procedures that will be implemented to ensure personnel are knowledgeable about the contents of the Plan and the need for notification.
 - (4) **Commitment of Manpower, Equipment and Material.** Identify the arrangements made to respond to spills, including the commitment of manpower, equipment and material.
 - (5) **If applicable, address all requirements of 40 CFR 112 pertaining to Spill Prevention, Control and Countermeasures Plans.**

- c. If a spill occurs, in addition to responding to a spill and reporting the spill to the appropriate agencies, the Contractor shall contact Western's dispatch office at (916) 353-2201. A written report detailing the actions taken, agencies notified, and what sampling and clean-up efforts will be needed to mitigate the spill shall be provided to the COR and Western's SNR Natural Resources department within 48 hours of the spill event.

10. Pesticides (Section 13.11 of Standard)

- a. **GENERAL:** The term "pesticide" includes herbicides, insecticides, rodenticides and fungicides. Pesticides shall only be used in accordance with their labeling and applied by appropriately certified applicators.
- b. **ENVIRONMENTAL PROTECTION AGENCY REGISTRATION:** Use EPA registered pesticides that are approved for the intended use.
- c. **PESTICIDE USE PLAN:** Provide a pesticide use plan that contains: (1) a description of the pesticide to be used, (2) where it is to be applied, (3) the application rate, (4) a copy of the label, and (5) a copy of required applicator certifications. Submit the pesticide use plan to the COR for review and comment 14 days prior to the date of intended application. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. Within seven days after application, submit a written final report to the COR, including the pesticide applicators report, in accordance with Standard 2 – Site work Section 2.1.1-5. "Soil-Applied Herbicide, (4) Final Report".

11. Treated Wood Poles and Members Recycling or Disposal (Section 13.12 of Standard)

- a. All wood poles and crossarms shall be removed from the right-of-way after completion of the project.
- b. Wood Poles will be disposed of in accordance with the Western wood pole disposal guidance provided by the SNR Natural Resources Department. Treated wood poles and members removed during the project shall be recycled or transferred to the public for accepted uses as indicated in the provided guidance.
- c. Treated wood poles and members transferred to a landfill or the public shall be accompanied by a written consumer information sheet on treated wood. Western will provide the consumer information sheet upon request. The Contractor shall obtain a receipt form (part of the consumer information sheet) from the recipient indicating that they have received, read, and understand the consumer information sheet.
- d. Treated wood products transferred to right-of-way landowners shall be moved off the right-of-way. Treated wood product scrap or poles and members that cannot be donated, reused, or recycled shall be properly disposed in a landfill that is approved by the state of California to accept treated wood and has signed Western's consumer information sheet receipt. Submit treated wood pole consumer receipt forms to the SNR Natural Resources Department within 30 days of disposal.

12. Prevention of Air Pollution (Section 13.13 of Standard)

- a. **GENERAL:** Ensure that construction activities and the operation of equipment are undertaken to reduce the emission of air pollutants. The Contractor shall comply with all applicable air quality rules established by the Bay Area Air Quality Management District, including but not limited to PM10 Emission Control Measures for Construction. All applicable permits for air emissions shall be obtained by the Contractor.

- b. Submit a copy of permits for construction activities, if required (e.g., “non-attainment” areas, state implementation plans, or Class I air-sheds), from Federal, State, or local agencies to the COR 14 days prior to the start of work.
- c. MACHINERY AIR EMISSIONS: The Contractor and subContractor machinery shall have, and shall use the air emissions control devices required by Federal, State or Local Regulation or ordinance.
- d. DUST ABATEMENT: Dust shall be controlled. Oil shall not be used as a dust suppressant. Dust suppressants shall be approved by the COR prior to use.

13. Prevention of Water Pollution (Section 13.16 of Standard)

- a. GENERAL: Ensure that surface and ground water is protected from pollution caused by construction activities and comply with applicable regulations and requirements. Ensure that streams, waterways and other courses are not obstructed or impaired unless the appropriate Federal, State or local permits have been obtained. Fueling of vehicles shall not be within 300 feet of a waterway.
- b. PERMITS: Ensure that:
 - (1) A National Pollutant Discharge Elimination System (NPDES) permit is obtained from the U.S. Environmental Protection Agency or State as appropriate if the disturbed construction area equals 1 acre or more. Disturbed areas include staging, parking, fueling, stockpiling, and any other construction related activities. Refer to www.epa.gov/npdes/stormwater for directions and forms.
 - (2) A dewatering permit is obtained from the appropriate agency if required for construction dewatering activities.
 - (3) Copies of permits and plans, approved by the appropriate regulating agencies, are submitted to the COR 14 days prior to start of work.
 - (4) The Contractor shall develop and implement a Stormwater Pollution Prevention Plan. The plan shall be developed by a qualified engineer or erosion control specialist and implemented prior to construction. The plan shall include:
 - (a) A description of potential pollution of storm water from erosion;
 - (b) A description of the management of dredged sediments and hazardous materials present on-site during construction (including vehicle and equipment fuels); and
 - (c) Details of how sediment and erosion control practices will comply with state and Federal water quality regulations.
- c. EXCAVATED MATERIAL AND OTHER CONTAMINANT SOURCES: Control runoff from excavated areas and piles of excavated material, construction material or wastes (to include truck washing and concrete wastes), and chemical products such as oil, grease, solvents, fuels, pesticides, and pole treatment compounds. Excavated material or other construction material shall not be stockpiled or deposited near or on stream banks, lake shorelines, ditches, irrigation canals, or other areas where run-off could impact the environment. Excavated material, stockpiled on site during construction, shall be stored

on heavy plastic and covered to prevent wind and rain erosion at a location designated by the COR.

- d. **MANAGEMENT OF WASTE CONCRETE OR WASHING OF CONCRETE TRUCKS:** Do not permit the washing of concrete trucks or disposal of excess concrete in any ditch, canal, stream, or other surface water. Concrete wastes shall be disposed in accordance with all Federal, State, and local regulations. Concrete wastes shall not be disposed of on any Western property, right-of-way, or easement; or on any streets, roads, or property without the owner's consent.
- e. **STREAM CROSSINGS:** Crossing of any stream or other waterway shall be done in compliance with Federal, State, and local regulations. Crossing of some waterways may be prohibited by landowners, Federal or State agencies or require permits.

14. Removal of Oil-contaminated Materials (Section 13.18 of Standard)

- a. **GENERAL:** Removing oil-contaminated material includes excavating, stockpiling, testing, transporting, cleaning, and disposing of these material. Personnel working with PCBs shall be trained in accordance with OSHA requirements. Submit employee training documentation records to the COR 14 days prior to the start of work.
- b. **CLEANUP WORK MANAGEMENT PLAN:** Provide a Cleanup Work Management Plan that has been approved by applicable Federal, State, or Local environmental regulation agencies. Submit the plan to the COR for review and comment 14 days prior to the start of work. Review of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. The plan shall address on-site excavation of contaminated soil and debris and include the following:
 - (1) Identification of contaminants and areas to be excavated.
 - (2) Method of excavation.
 - (3) Level of personnel/subContractor training.
 - (4) Safety and health provisions.
 - (5) Sampling requirements including quality control, laboratory to be used.
 - (6) Management of excavated soils and debris.
 - (7) Disposal methods, including transportation to disposal.
- c. **EXCAVATION AND CLEANUP:** Comply with the requirements of Title 40, Part 761 of the U.S. Code of Federal Regulations (40 CFR 761).
- d. **TEMPORARY STOCKPILING:** Excavated material, stockpiled on site during construction, shall be stored on heavy plastic and covered to prevent wind and rain erosion at a location designated by the COR.
- e. **SAMPLING AND TESTING:** Sample contaminated debris and areas of excavation to ensure that contamination is removed. Use personnel with experience in sampling and, in particular, with experience in PCB cleanup if PCBs are involved. Use analytical methods approved by EPA and applicable State regulations.
- f. **TRANSPORTATION AND DISPOSAL OF CONTAMINATED MATERIAL:** The Contractor shall be responsible and liable for the proper loading, transportation, and disposal of contaminated material according to Federal, State, and local requirements. Use only transporters and disposal sites approved by Western.

- g. **POST CLEANUP REPORT:** Provide a Post-Cleanup Report that describes the cleanup of contaminated soils and debris. Submit the report to the COR prior to submittal of final invoice. The report shall contain the following information:
- (1) Site map showing the areas cleaned.
 - (2) Description of the operations involved in excavating, storing, sampling, and testing, and disposal.
 - (3) Sampling and analysis results including (1) Name and address of the laboratory, (2) sample locations, (3) sample dates, (4) analysis dates, (5) contents of contaminant (e.g. PCB or total petroleum hydrocarbons) in parts per million (ppm).
 - (4) Certification by the Contractor that the cleanup requirements were met.
 - (5) Copies of any manifests, bills of lading, and disposal certificates.
 - (6) Copies of correspondence with regulatory agencies that support completion of the cleanup.

15. Conservation of Natural Resources (Section 13.19 of Standard)

- a. **GENERAL:** Federal law prohibits the “take” of endangered, threatened, proposed or candidate wildlife and plants, and destruction or adverse modification of designated Critical Habitat. Federal law also prohibits the “take” of birds protected by the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act. “Take” means to pursue, hunt, shoot, wound, kill, trap, capture or collect a protected animal or any part thereof, or attempt to do any of those things without a permit from U.S. Fish and Wildlife Service. The Contractor will take precautions to avoid harming other wildlife species. Contractor shall restrict all ground disturbing activities to areas that have been surveyed by Western for natural resources and as specified in accordance with Standard 1 – General Requirements, Sections 1.3.1 Rights-of-way and 1.3.2 Access to the Work and Haul Routes.
- b. **ENVIRONMENTAL CONCERNS:** The Contractor is responsible to comply with all terms and conditions set forth in the Biological Opinion - Section 7 Formal Consultation on the Delta-Mendota Canal/California Aqueduct Intertie Project, Alameda County, California as included in Appendix B.
- c. **KNOWN OCCURRENCE OF PROTECTED SPECIES OR HABITAT:** Following issuance of the notice to proceed, and prior to the start of construction, Western will provide training to all Contractor and Subcontractor personnel and others involved in the construction activity if there is a known occurrence of protected species or habitat in the construction area. Untrained personnel shall not be allowed in the construction area. Western will provide drawings or maps showing sensitive areas located on or immediately adjacent to the transmission line right-of-way and/or facility. These sensitive areas shall be considered avoidance areas. Prior to any construction activity, the avoidance areas shall be marked on the ground by Western. If access is absolutely necessary, the Contractor shall first obtain written permission from the COR, noting that a Western and/or other Federal or state government or tribal agency biologist may be required to accompany personnel and equipment. Ground markings shall be maintained through the duration of the contract. Western will remove the markings during or following final inspection of the project.

- d. UNKNOWN OCCURRENCE OF PROTECTED SPECIES OR HABITAT: If evidence of a protected species is found in the project area, the Contractor shall immediately notify the COR and provide the location and nature of the findings. The Contractor shall stop all activity within 200 feet of the protected species or habitat and not proceed until directed to do so by the COR.

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DIVISION 15 DRAWINGS

The standard drawings are available at <http://www.wapa.gov/business/buys.htm>

LOCATION MAP:

1. TRY 0015 – Rev. C - Location and Vicinity Map

CONCRETE:

2. TRY-DCI 2100 – 024W-45 Steel Pole Structure – Foundation

TRACY SUBSTATION:

3. TRY 1000 – Rev. Q EI – General Location Plan (Existing Installation)
4. TRY 1196 – Fiber Optic Cable Mounting
5. TRY 1138 – Rev. B – Sections N-N and P-P
6. TRY 1520-3 – Rev. B – Grounding Plan (Sheet 3 of 4)
7. TCY 4000 – Rev. M EI – Service Building Conduit Arrangement and Grounding (Existing Installation)
8. TCY 7124-2 – Rev. G – Communications Area Rack (A6-A8) – Elevations & Layout (Sh.2 of 5)
9. TCY 7193-2 – Rev. A – Fiber Distribution Unit #1 Bejed (Rack A8) – Layout & Cross Connect Assignments
10. TCY 7300 – Optical Splice Enclosure Splicing Diagram #1
11. 214-D-16188 EI – Cable Tray Layout – Plan and Sections (Existing Installation)
12. TRY 2219-1 – Control Cable Tunnels – Plan
13. TRY 2219-2 – Control Cable Tunnels –Sections
14. 214-D-16286 EI –Control Building and Synchronous Condenser Station – First Floor Plan & Finish Schedule (Existing Installation)
15. 214-D-16107 EI –115kV (69kV) Tunnel Details, Recess and Insert Locations (Existing Installation)
16. TRY T400 EI –Tracy Control Building Server Room (Existing Installation)

DCI SUBSTATION:

17. DCI 1000 – Rev. 2 – Site Plan
18. DCI 1110 – Rev. 4 – Switchyard Sections
19. 214-D-25304 – Rev. 2 EI – Switchyard Grounding and Buried Conduit Plan (Existing Installation)
20. 214-D-25295 – Rev. 2 FIO – Electrical Installation, Motor Deck EL. 200.00, Conduit System (For Information Only)
21. 214-D-25296 – Rev. 1 EI – Electrical Installation Lighting Plan (Existing Installation)

TRANSMISSION LINE STEEL POLE STRUCTURES:

22. 43-024W 2200 – Rev. B – 024W-45 Steel Pole Switch Structure – Outline and Design Loads

WOOD POLE STRUCTURES:

23. 41 6138 – Rev. B – Typical Details for Dead End Tees

24. 41 6115 – Type SS-1 69kV Tangent Suspension Structure

25. 41 6153 – Rev. A - Typical Details for Optical Ground Wire Splice Structures

26. 41 6071 – Guying Requirements for Single Pole Construction with Overhead Ground Wire

GLUED LAMINATED STRUCTURES:

27. 41 6143 – Rev. A – Type LSSA-GL and LSLA-GL 69kV Angle Suspension Glued Laminated Wood Structures-Light Loading

28. 41 6145 – Rev. A – Type LST-GL 69kV Tangent and Angle Tension Glued Laminated Wood Structure-Light Loading

29. TRY-DCI 6000 – Type LSTF-GL 69kV Flat Top Tension Structure Light Loading – Glued Laminated

TRANSMISSION LINE ELECTRICAL:

30. TRY – DCI 1000 – Material Quantities

31. TRY – DCI 1001 – Vibration Dampers: Conductor and OPGW

32. TRY – DCI 1002 – Underground Utilities Near Tracy Substation

33. TRY – DCI 1003 – Fence and Road: South West Section

34. TRY – DCI 1004 – Fence, and Road: East Section

35. TRY – DCI 1005 – Special Span Construction: TRY TOS to 0/4 OPGW

36. TRY – DCI 1006 – Plan View of 0/4: Steel Pole Switch Structure

37. TRY – DCI T110 – Shoo-Fly Plan View

38. TRY – DCI T111 – Shoo-Fly Guying

PLAN AND PROFILES:

39. TRY-DCI T400 – Plan and Profile - Summary

40. TRY-DCI T401 – Plan and Profile

41. TRY-DCI T402 – Plan and Profile

42. TRY-DCI T403 – Plan and Profile

43. TRY-DCI T404 – Plan and Profile

44. TRY-DCI T405 – Plan and Profile

45. TRY-DCI T406 – Plan and Profile

GEOLOGY:

46. TRY-DCI T407 – Delta-Mendota Canal and California Aqueduct Intertie – Site MP 7.20 – Surficial Geology and Location of Geologic Sections

47. DCI 8000 – Logs of Exploration

48. DCI 8001 – Logs of Exploration

49. DCI 8002 – Logs of Exploration

50. DCI 8003 – Logs of Exploration

51. DCI 8004 – Logs of Exploration

52. DCI 8005 – Logs of Exploration

53. DCI 8006 – Logs of Exploration

54. DCI 8007 – Logs of Exploration

Message from the Administrator

Many words are written about commitment and policy concerning occupational safety and health programs. But until these words are put into action, they remain just words. We at Western believe that safety is not just a piece of paper but integrated actions in everyday work practices. Safety is a way of life at Western, a condition of employment. Our program is based on four points.

- ◆ Safety procedures or common sense must not be set aside by any employee, whether Federal or contract, to meet a project schedule or for personal convenience.
- ◆ Employees and Contractors must believe that they have the right and the responsibility for identifying and taking action to reduce, if not eliminate, hazardous work environments and hazardous work practices.
- ◆ Managers and supervisors must lead by example and execute their responsibility to ensure each job is accomplished in a safe and healthful manner.
- ◆ Safety is a personal responsibility. Each individual makes the decision on what action to take to accomplish a task.

I am personally committed to a strong safety program and am asking you to join me in this commitment. Together we can make Western a safe place to work.

A handwritten signature in black ink, appearing to read 'Timothy J. Meeks', is written over a horizontal line.

Timothy J. Meeks

